SPHÆRELLA CERCIDICOLA.—Perithecia erumpent (100μ) scattered, mostly on the upper side of the leaves, at length broadly perforated above; asci oblong-cylindric, 35 x 5μ; sporidia closely packed, overlapping and subbiseriate, oblong-pyriform, 1-septate, 11–13 x 2.5–3μ, slightly curved and constricted.

On fallen leaves of *Cercis Canadensis*. June. No. 550.

SPHÆRELLA LACTUCÆ.—Epiphyllous, on dark brown (2–4μ), concentrically wrinkled spots with a distinct raised border; perithecia erumpent subglobose (120–150μ), of coarse cellular structure; asci 40–75 x 12–14μ, sessile, oblong; sporidia biseriate, ovate-oblong, 1-septate and constricted at the septum, 14–16 x 5–μ, ends obtuse.

On living leaves of *Lactuca Canadensis*. Aug. No. 619.

The Nectar-Glands of Apios tuberosa.

By AUG. F. FOERSTE.

The flowers of *Apios tuberosa* are arranged in dense panicles, which have the appearance of racemes. At the base of the first main axis are two small bracts, one of them frequently subtending another panicle. The main axis of the second panicle has also two bracts at its base, one of which sometimes subtends a third flower-cluster in an insignificant rudimentary state. The third flower-cluster rarely, if ever, develops. The second panicle arises so close to the base of the first panicle that both seem to spring from the axil of the leaf.

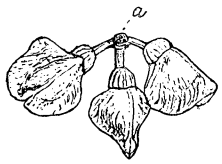

Fig. 1

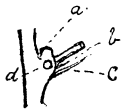

Fig. 2

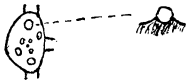

Fig. 3

Fig. 4

Although but one of the basal bracts usually subtends a panicle, the other not rarely subtends a minute rudimentary flower-cluster, which rarely develops its flowers. The main axis of each panicle bears at short distances the secondary axes or racemes, each of which is subtended by a bract. Each raceme (Fig. 1) bears three flowers, all of them subtended by bracts. Two of the flowers are placed at either side of each raceme, the third being placed just above the bract subtending the raceme. The bract (Fig. 2 *b*) of the third flower is smaller than the one subtending the raceme (Fig. 2 *c*). The three flowers are placed at the very base of the short stubby axis of the raceme, and are inserted at about the same height. The top of this axis (Fig. 2 *a*) suddenly becomes truncated, and on the flattened surface thus produced may be seen the remaining aborted flowers of the raceme. Under a low power of the miscroscope they appear as so many clusters of lanceolate, thin scales. These clusters usually wither and fall off a short time before the flowering of the three

lower members of the raceme. Their locality, however, is marked by small rings (Fig. 3) slightly raised above the flat surface formed by the end of the axis. While the lower flowers of the raceme are in blossom the rings representing the points of attachment of the upper flowers are exuding a kind of honey. It is necessary to mention, however, that only one or two of these rings seem to yield honey at the same time. This flows quite freely, and when removed by my hand was usually replaced in less than two or three minutes. The honey-glands, being extra floral, seem to take no part in any adaptation for cross fertilization, but they are abundantly visited by ants. Several plants growing in my garden are almost covered with them. There are ants going up and down the vines. Every panicle on the entire plant has one or more insect visitors upon it. Some panicles have seven or eight ants upon them, one to every gland in full operation. Ants are usually supposed to be beneficial to plants of this kind by warding off the insect enemies to which they may be subject. It may be noted in connection with this that my plants are free from insects before the period of honey secretion, as well as afterwards; still, any insects trying to get at the flowers during their period of blossoming would find themselves in rather an uncomfortable

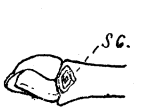

Fig. 5

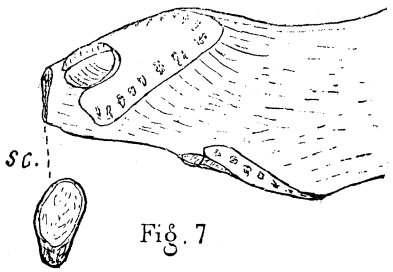

Fig. 7

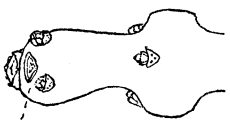

Fig. 6

position and would be effectually *crawled over* by the ants. The flowers, after anthesis, wither and fall off at a joint between the flower and pedicel. The pedicel falls of later at a joint next the axis of the raceme. A very remarkable discovery to me, however, was the fact that the ends of the panicle, together with the raceme that belongs to them, never mature. The entire panicle appears perfectly healthy until a short time before anthesis, then *the ends of the panicles* (Fig. 4) *suddenly wither and fall off at a clean-cut joint*, hence *all panicles in the flowering state are really truncated.* The end of the panicle shown in Fig. 4 had thirteen racemes upon it, each with its three flowers and truncated axis; the very summit of the panicle I forgot to examine. It was a curious sight to see panicle after panicle lose its end without any special reason for such an operation that I could discover. The pedicels of the flowers, in dropping off, leave a circular scar (Fig. 2 *d*) similar to those left by the aborted flowers. The latter are arranged "spirally" on the truncated end of the axis. In the specimen figured (Fig. 3) the spiral turned toward the right, and the sixth pit or ring stood next to the first. The first two or three of these rings are the honey producers. The three developed flowers

do not maintain a spiral arrangement similar to the aborted flowers, but an examination of the plant would readily show that displacement is unavoidable. Of the flowers, one of those at the side blossoms first, then the one on the opposite side, and lastly the one in the

Fig 10

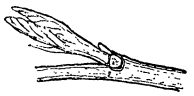

Fig 8

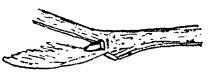

Fig. 9

middle. The arrangement of the various flowers has not been sufficiently studied to *settle* the phyllotactic arrangement of those on the axis of the raceme. How necessary bees are to insure fertilization may be seen from the fact that those clusters which escape the attention of bees by being too much hidden by the surrounding foliage, never spring the keel, so that the flowers wither and die without the keel being loosened. (Gray, Struct. Bot. p. 218). Flowers thus unsprung seem to last longer.*

In connection with this it may be interesting to note that in *Tilia Americana* (Fig. 5) *Catalpa speciosa* (Fig. 6) and *Ailanthus glandulosus* (Fig. 7) the terminal part of the leaf branches falls off, leaving a clean scar (*sc*). The branches are continued by buds in the axils of lower leaves. In *Hamamelis Virginica* (Figs. 8, 9 and 10) the leaves fall off in autumn and leave a scar. In the following spring a plane has been formed just beneath the scar of the former year. At this plane the leaf-scar of the former year falls off leaving another scar for the spring time. This singular phenomenon might be called that of a "deciduous leaf-scar." The accompaning drawings will make unnecessary all further description.

DESCRIPTION OF FIGURES.—*Apios tuberosa.* Fig. 1. Entire raceme seen from above. Fig. 2. The same x 5; flowers fallen off, pedicel of middle flower remaining: *a*, truncated axis of the raceme; *b*, bract subtending the middle flower; *c*, bract subtending the raceme; *d*, circular depression left by the pedicel of the flowers. Fig. 3. Truncated axis of raceme x 5, showing attachment of flower-pedicels. Fig. 4. Deciduous end of the panicle. Fig. 5. *Tilia Americana:* scar, *s c*, of leaf-branch. Fig. 6. *Catalpa speciosa:* scar, *s c*, of leaf-branch. Fig. 7. *Ailanthus glandulosus:* scar, *s c*, of leaf-branch. Figs. 8 and 9. *Hamamelis Virginica;* front and side views of leaf-scar before falling off. Fig. 10. Deciduous leaf scar.

New Grasses.

By GEORGE VASEY.

STIPA SCRIBNERI.—Culms 2–3 ft. high, stout, erect; lower leaves half as long as the culm, smooth, flat below, becoming involute at

* Note. The following from Prof. Trelease is of interest: "The sort of glands you find in *Apios* are also found in other Leguminosæ, e.g., species of *Dolichos Phaseolus*, and *Canavalia*. I have noticed them in all but the last named genus; probably they occur in many others.

References: Trelease, in Comstock's Report on Cotton Insects, 1879, 325; *American Bee Joural*, 1880, xvi., 271–2., Figs. 9–10. Delpino, in Atti della R. Universita, Genova, 1880, iv., part i. p. 27."